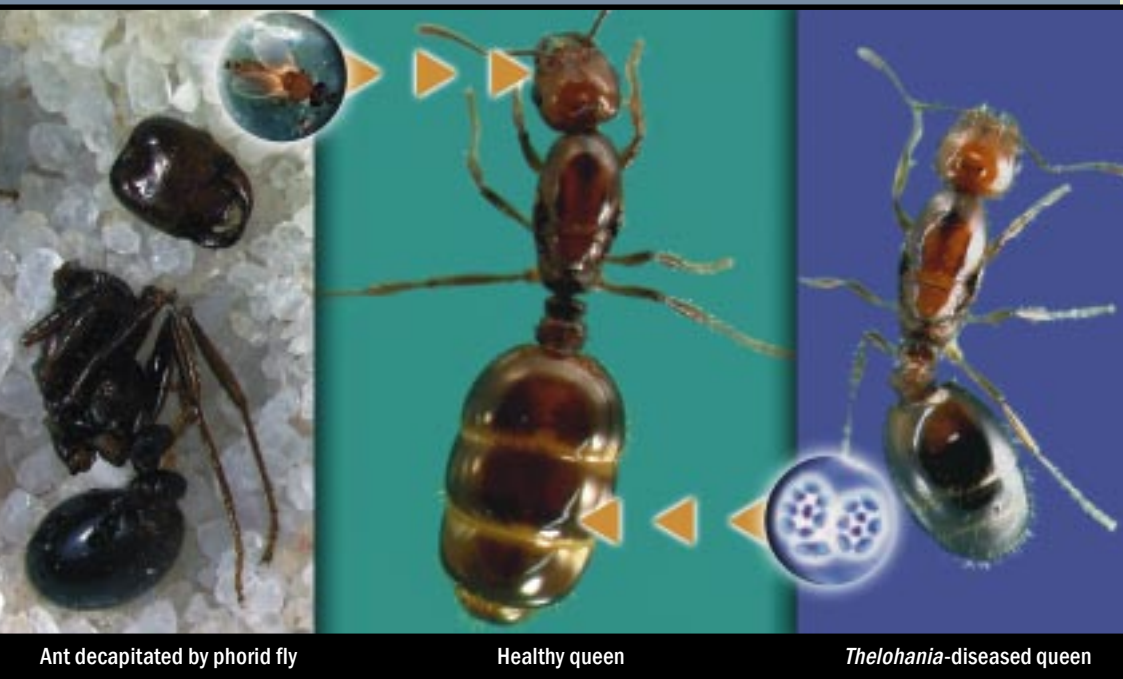


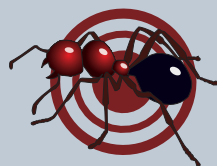
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suppression of **Fire Ants** using baits and **Biological Control**



Objectives

1. Release and spread natural enemies for fire ants — decapitating flies and *Thelohania* fire ant disease.
2. Integrate use of baits and biological control to provide 80% sustained, areawide reduction of fire ants.
3. Save at least \$4 billion a year in cost of fire ant control and damage for agricultural producers, businesses, homeowners, government and military.
4. Reduce reliance on repeated applications of insecticide for fire ant control.
5. Restore ecological balance in the natural environment.



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AREAWIDE SUPPRESSION OF FIRE ANTS

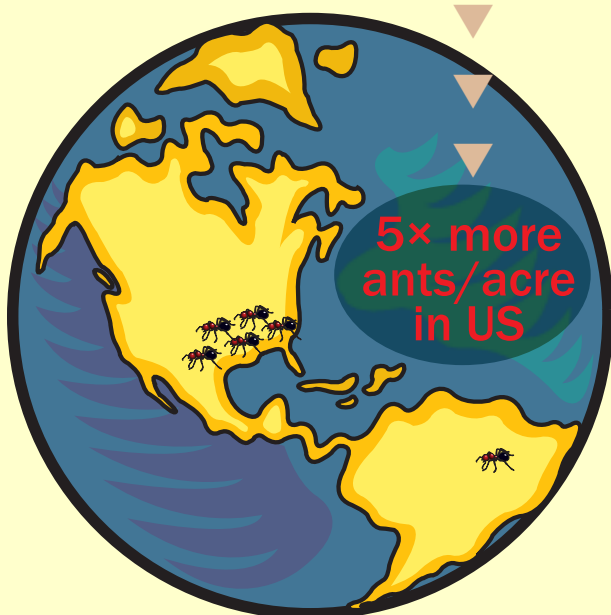


Above: Aerial applications needed for control of fire ants in pastures are costly.

Right: Foraging fire ant workers not only sting humans, they harm livestock, endangered species and other wildlife.



IMPORTED FIRE ANTS



How they got here

Imported fire ants first came to the United States around 1930. Seventy years later there are five times more ants per acre here in the States than in their native land of South America. Natural enemies of fire ants keep in check most of the ants in South America. But the fire ants that came to the States escaped their natural enemies and thrived in the southern landscape.

A crisis brews

Until now, the primary way to control fire ants has been to use insecticides. And the only way to maintain control has been to apply insecticides two to four times a year at a cost of at least \$10 an acre for each treatment. Treating all infested land would cost \$6 billion to \$12 billion a year.

Because of the expense and perceived hazard of insecticide treatments, most landowners do nothing. Uncontrolled, fire ants have become serious pests. They damage crops,

livestock, and electronics and sting people. By killing wildlife and even endangered species, they upset the ecological balance of nature. Fire ant losses total almost \$6 billion a year in urban and agricultural areas.

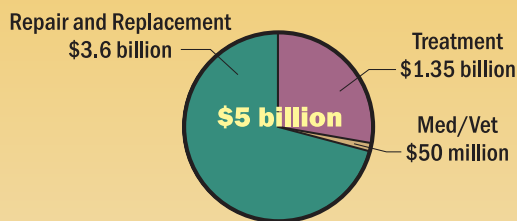
Why natural enemies?

A reasonable solution for fire ants is release of natural enemies to provide biological control. Natural enemies of fire ants have been found in South America and have proven safe and effective. Natural enemies spread on their own.

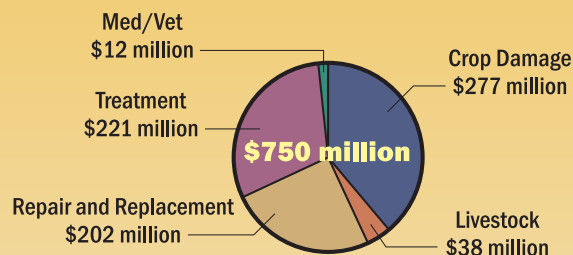
Two effective natural enemies of fire ants have been developed as biological control agents: *Thelohania* fire ant disease and decapitating phorid flies.

Natural enemies can provide control wherever ants are. Most affect *only* fire ants, not other species. They also can improve and extend the effectiveness of insecticide treatments.

Total Annual Fire Ant Losses to Households, Business, Schools, Government, and Institutions



Total Annual Fire Ant Losses to Agriculture



Using natural enemies to provide biological control

No problems for people or pets

DECAPITATING PHORID FLIES

Decapitating phorid flies not only remove ants' heads, they weaken colonies because remaining ants — trying to avoid fly attack — stop looking for food outside their nest.



Female flies are released near mounds, attack ants, and lay eggs inside them. The egg hatches into a tiny maggot that burrows into the ant head.



Inside the head, the maggot causes the fire ant head to fall off, killing the ant.



The maggot pupates inside the head, and the adult fly squeezes out the ant's mouth.



Each newly emerged female fly can attack and kill 200 to 300 more ants.



Remaining fire ants (arrow) hide to avoid attack by flies (circle). When ants hide, their colony starves and weakens, so ant infestations do not spread.

THELOHANIA FIRE ANT DISEASE

Fire ant disease weakens fire ant colonies and results in 60 percent fewer ants per acre.



Researchers place infected larvae on the fire ant mound. Ants adopt and raise infected larvae. The disease spreads to workers and the queen.



In the queen, the disease multiplies, causing the abdomen to shrink. This is a healthy queen, left, and a diseased queen.



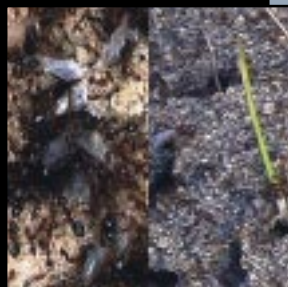
Diseased queens have dark cysts in their ovaries and produce 90 percent fewer eggs. These queens are dissected to show healthy ovaries, left, and diseased ovaries.



The few eggs the queen produces are diseased. Only a few larvae and workers develop. The workers in a healthy colony, left, greatly outnumber workers in a diseased colony.



A diseased, weak colony cannot defend itself. Stronger, raiding colonies, left, carry off and adopt the diseased larvae.



Strong colonies, which produce many winged ants, left, eventually become diseased and weak, producing only a few winged ants, so ant infestations do not spread.

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Preliminary results

Plots of land were treated with insecticide only. These treatments reduced fire ant populations by about 90 percent. But within several months fire ants reinvaded from surrounding areas.

Other plots were treated with insecticide, and natural enemies were released. The insecticide again reduced populations by about 90 percent, but fire ants did not reinvade. Even after two years, fire ant populations were still suppressed 96 to 100 percent by integrating use of insecticide and natural enemies. As fire ant populations decreased, beneficial fauna returned.

Releasing natural enemies

Natural enemies are being established at widely separated locations throughout the South. These natural enemies will reproduce and spread on their own. Decapitating flies can spread at the rate of about 10 miles a year. Fire ant disease spreads much more slowly.

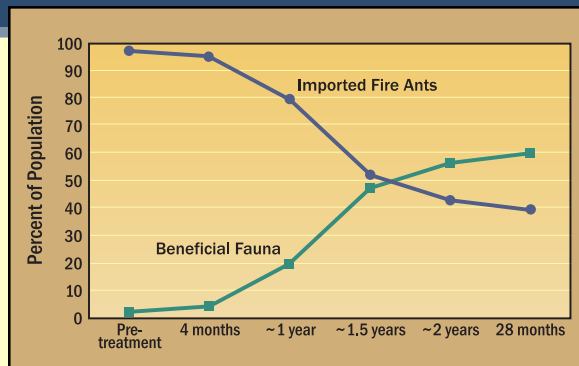
Benefits

Integration of biological control with traditional insecticide should provide sustained reduction of fire ant populations without multiple insecticide applications. It can restore the natural ecological balance that was lost when fire ants invaded and killed native wildlife.

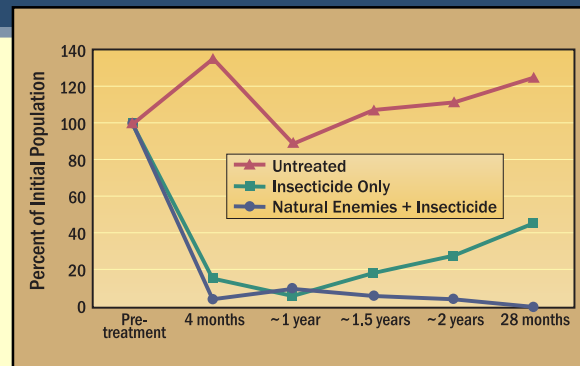
The bottom line

Everyone will benefit: agricultural and livestock producers, schools, businesses, military, and especially the natural environment.

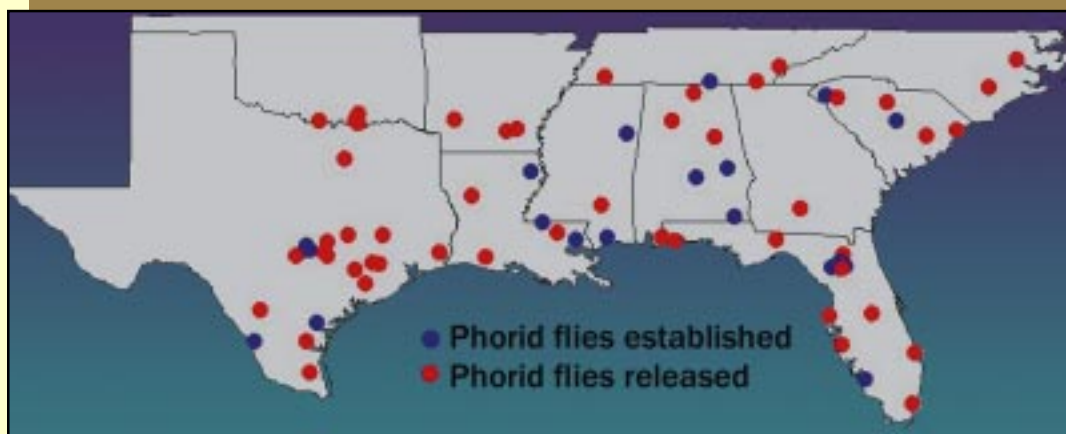
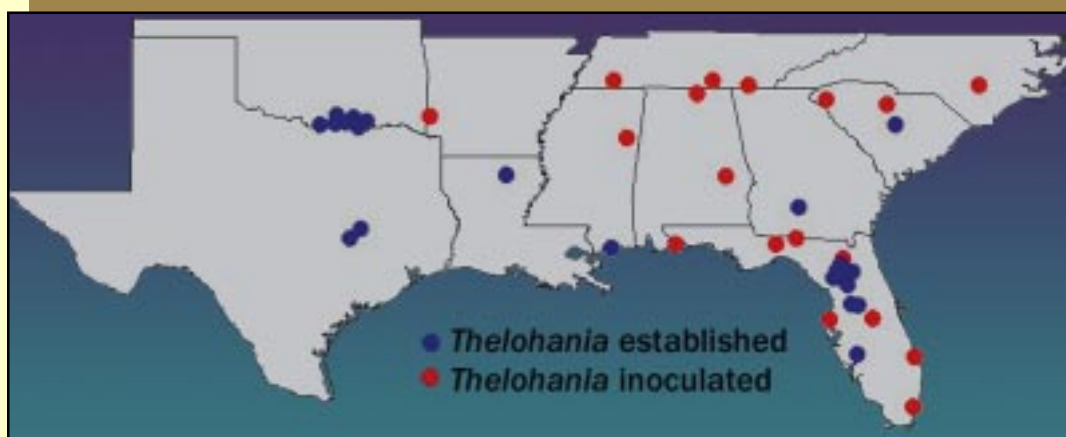
Areawide suppression using baits and biological control of fire ants is expected to save more than \$4.6 billion a year in fire ant damage.



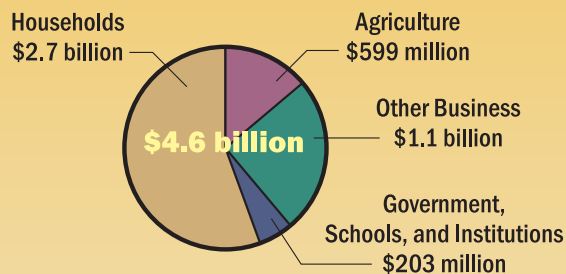
Integrated management reduces fire ant populations, allowing beneficial fauna to flourish. (South Carolina 2000–2003)



Fire ant populations are suppressed longer by integrating natural enemies and insecticides. (South Carolina 2000–2003)



Potential Annual Benefits of Using Natural Enemies to Suppress Fire Ants



Note: Economic estimates are based on a preliminary analysis of a U.S. economic impact survey of imported fire ants.